SECTION 5.9 NOISE
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5.9 NOISE

This section presents an assessment of potential noise effects related to the Tesla Power Project (TPP). This assessment includes an evaluation of the potential effects to the nearest sensitive receptors and to power plant operations personnel. An essential part of this assessment is a comparison of expected noise levels with acceptable noise levels presented in applicable laws, ordinances, regulations, and standards (LORS) and with existing background levels at noise-sensitive receptors.

In its Community Noise Ordinance, the County of Alameda has set exterior noise standards to regulate noise generated within unincorporated areas of the county. The lowest County noise level limit applicable to noise-sensitive uses, including residences, is a nighttime (10 p.m. to 7 a.m.) limit of 45 dBA. Additionally, the Noise Element of the Alameda County General Plan has established a noise level limit of 60 dBA CNEL as a level not to be exceeded at exterior locations of residential land uses. The Alameda Building Code has adopted an interior noise level standard of 45 dBA CNEL inside residential structures. The County ordinance requires that any residential structure exposed to an exterior CNEL of 60 dBA or above has to be designed to limit intruding noise to the prescribed level of 45 dBA CNEL.

The regulations of the California Energy Commission (CEC) require identification of facilities, where quiet is an important attribute, that are located within the area potentially affected by an increase of 5 dBA or more (called the “impacted area”). An increase of less than 5 dBA over background levels would generally be presumed to result in no significant adverse effect. An increase of 5 dBA or more is evaluated more closely to determine significance.

For project sites such as the TPP site that are located away from population centers and transportation corridors, an increase of more than 5 dBA in noise levels in a very quiet environment would not necessarily result in a significant adverse effect. This is because the overall noise levels of the background combined with project noise levels would still be low enough to not cause much annoyance. In such a case, the most restrictive absolute noise levels, as established by the LORS, provide an appropriate means of determining impact significance.

5.9.1 Affected Environment

The predominant land use at the project site and vicinity is cattle grazing. Several 230 kV and 115 kV electric power transmission lines cross the site in a general north-south direction and are supported by steel latticed towers. The PG&E Tesla Substation is located approximately 0.5 mile south of the project site. Wind farm electrical production is another major land use in the area. A few isolated rural residences exist south and southeast of the site near the existing Tesla Substation.

Primary sources of noise in the area are the substation and light traffic on the local roads. Patterson Pass Road generally has very light traffic except during the morning and afternoon rush hours when many commuters use it to bypass I-580 across Altamont Pass.

The CEC's power plant certification regulations require that noise measurements be made at noise-sensitive locations where there is a potential for an increase of 5 dBA or more over existing background noise levels during construction or operation of a proposed power plant. Consequently, an ambient noise survey was conducted in the area during the period of April 24 - 25, 2001 to document existing levels of noise. The first location monitored was north of the site beyond I-580 at the proposed location of a water pumping station for the project. Two other monitoring locations, representative of the nearest noise-sensitive receptors, were selected around the site for continuous monitoring over a 25-hour period, as required by CEC regulations. Both of the locations were near the nearest residences to the site. The selected locations are shown in Figure 5.9-1. A brief description of each monitoring location and the types of sounds heard during the survey are presented below:

- ***Location 1*** - North of the site on Midway Road at the California Aqueduct north of I-580 near the site of the proposed water pumping station for the project. The microphone was attached to a guy wire from a power pole between the road and the aqueduct. Sources of noise included local traffic on Midway Road and occasional traffic noise from I-580.
- ***Location 2*** - In front of the nearest residence about 1 mile southeast of the site on Midway Road. The residence was about 200 yards south of Patterson Pass Road and 400 yards east of the Tesla Substation. The microphone was attached to the pasture fence across the road from the residence. Sources of noise included the substation and traffic on Patterson Pass Road. Midway Road ended about 0.5 miles south of the residence at a couple of other residences.
- ***Location 3*** - South of the site at the Mulqueeney Ranch gate just west of the substation. The ranch residence was about 0.25 miles south of the gate and 1.2 miles south of the site. The microphone was attached to the fence on the west side of the gate about 50 feet from Patterson Pass Road. Primary sources of noise included traffic on Patterson Pass Road and the Tesla Substation. Wind and insect noise were insignificant at all locations.

5.9.1.1 Noise Survey Methodology

Continuous measurements of the A-weighted sound level were made simultaneously over the complete 25-hour period using three (3) Larson-Davis Laboratories Model 700 sound level meters (LDL 700) with integral data loggers. The instruments were equipped with optional circuitry and microphones to permit them to meet the requirements of ANSI S1.4-1983 for Type I precision sound level meters. The Bruel & Kjaer (B&K) Type 4176 ½" prepolarized random incidence microphones were remotely mounted (via a 10-foot microphone extension cable and preamplifier) at a height of about 5 feet above the ground. Foam windscreens, 3½ inch in diameter, were used to reduce wind-generated noise.

The calibration levels of the instruments were checked before and after the 25-hour monitoring period using a B&K Type 4230 sound level calibrator. The analyzers were internally timed to turn on and off automatically on the start and stop days, respectively. They were generally unattended during the monitoring period, but the monitoring technician did visit each site three times to make observations about sounds heard and general weather conditions. Observations were made mid-day and late afternoon on April 24, and very early morning on April 25, 2001.

The LDL 700's were programmed to measure and record the equivalent sound level (L_{eq}) for each minute of the 25-hour period as well as compute and store the statistical sound levels exceeded 10, 50 and 90 percent of each hour (L_{10}, L_{50} and L_{90}). The L_{eq} for each hour of the period was also computed and recorded. At the end of the 25-hour period, the data were downloaded directly into a laptop computer for storage and further analysis, including computation of the 24-hour L_{eq}, day/night level (L_{dn}), and the community noise exposure level (CNEL). A spreadsheet program was used to produce graphs of the data. One graph was produced of the 1-minute L_{eq} levels to show the often rapid variation in sound levels experienced in outdoor environments. Another graph was produced of the hourly L_{eq} levels and the L_{50} and L_{90} statistical sound levels showing all three curves in the same plot.

5.9.1.2 Noise Survey Results

Weather conditions during the noise survey were pleasant with temperatures ranging from 55 degrees at night to 80 degrees during the afternoon. Relative humidity levels ranged from 33 to 61 percent and no precipitation occurred during the survey. Wind speeds were generally light ranging from calm to about 3 mph. The wind direction was generally out of the north during the first part of the survey and then it switched around to the southwest. Typical wind directions in the area are from the west or southwest. Sky conditions were generally clear.

The hourly Leq levels, along with three commonly used 24-hour composite noise descriptors of the continuous A-weighted sound levels are presented in Table 5.9-1 for the three monitoring locations. The hourly statistical levels are presented in Table 5.9-2.

The Noise Element of the Alameda County General Plan indicates that CNEL levels of up to 60 dBA are acceptable for outdoor residential spaces. The Federal EPA defines an L_{dn} level of 55 dBA as adequate to protect against annoyance and interference with outdoor activities (EPA, 1974). The measured levels at all locations are above the EPA guideline level of 55 dBA L_{dn} but at or below the county identified acceptable level.

These energy-averaged data are influenced by high level events. This is due to the logarithmic nature of the averaging process whereby, for example, a level of 60 dBA contains ten times the energy of a 50 dBA level and counts ten times as much in the average. Ideally, the microphone would be placed the same distance from roads as the houses of interest rather than at the roadway. This is seldom possible, however the statistical L_{50} and L_{90} levels are less influenced by these short-duration intrusive events from the record.

Table 5.9-1. Noise Survey L_{eq} Data

		Location 1	Location 2	Location 3
Date	Hour Beginning	Pumping Station L_{eq} (dBA)	Midway Rd Res L_{eq} (dBA)	Mulqueeney Ranch L_{eq} (dBA)
4/24/01	0500	*45.3*	56.5	57.5
4/24/01	0600	*45.3*	56.5	61
4/24/01	0700	*52.4*	51.5	58
4/24/01	0800	*52.4*	51	53.5
4/24/01	0900	*52.4*	49	47
4/24/01	1000	*52.4*	51.5	52
4/24/01	1100	*52.4*	47.5	46
4/24/01	1200	54.5	45.5	46
4/24/01	1300	53	55	47.5
4/24/01	1400	54	47	51
4/24/01	1500	53	50	55
4/24/01	1600	50	54.5	56
4/24/01	1700	54	56.5	57
4/24/01	1800	50.5	53	53
4/24/01	1900	51	53	52
4/24/01	2000	52.5	56.5	49.5
4/24/01	2100	51.5	54	48.5
4/24/01	2200	51.5	52	44.5
4/24/01	2300	48.5	50	52
4/25/01	0000	49.5	49	44.5
4/25/01	0100	46.5	49	41.5
4/25/01	0200	46.5	47.5	42
4/25/01	0300	49	49.5	46.5
4/25/01	0400	49.5	49	50.5
4/25/01	0500	53	51.5	57
	$L_{eq(24)}$	51.6	52.3	53.4
	L_{dn}	56.5	58.0	60.1
	CNEL	56.8	58.5	60.2

Note: 1. Small font italicized numbers are night and day average levels, respectively to replace missing data for computation of composite levels.
2. Shaded areas represent nighttime hours.

Table 5.9-2. Noise Survey Statistical Level Data

Hour Beginning	Location 1 Water Pumping Station			Location 2 Nearest Residence SE			Location 2 Mulqueeney Ranch Gate		
	L10	L50	L90	L10	L50	L90	L10	L50	L90
0500				57.0	48.5	39.5	61.5	47.0	42.0
0600				58.5	54.5	47.5	65.0	55.0	47.5
0700				54.0	47.5	41.0	63.0	49.5	41.5
0800		Data		50.0	42.0	37.5	53.5	41.0	37.0
0900		Missing		50.5	42.0	37.5	47.5	39.5	37.0
1000				51.5	41.0	36.5	52.0	39.5	36.0
1100				49.5	41.0	35.0	47.0	39.0	35.5
1200	49.0	38.5	34.5	49.0	39.0	34.0	47.5	38.0	35.5
1300	46.0	38.5	34.5	53.5	42.5	36.0	49.5	39.5	36.0
1400	45.5	36.5	33.5	50.5	41.5	35.0	51.5	38.5	35.5
1500	48.5	39.0	34.5	51.0	45.0	38.5	59.0	43.0	36.5
1600	46.0	39.0	34.5	57.0	53.5	44.5	62.0	43.5	37.5
1700	50.5	43.5	38.5	57.5	54.0	48.0	62.5	44.0	37.0
1800	49.5	43.0	38.5	54.5	50.5	46.5	56.0	41.0	36.5
1900	49.5	44.0	40.5	54.5	51.0	47.5	53.0	45.0	40.5
2000	52.0	49.5	47.0	58.0	56.0	54.5	53.0	46.5	44.0
2100	51.5	48.5	47.0	55.5	53.5	51.5	50.0	44.5	41.5
2200	51.0	48.5	46.5	53.5	51.5	49.0	46.5	42.5	40.5
2300	50.0	48.0	46.0	52.0	49.5	47.5	51.0	43.0	40.5
0000	50.0	47.5	45.5	51.0	48.5	45.0	44.5	41.5	39.5
0100	48.0	46.0	44.0	51.5	48.5	45.0	42.5	40.5	38.5
0200	48.0	46.0	44.0	50.0	46.5	41.5	44.0	40.0	37.5
0300	50.0	47.0	45.0	52.5	48.5	44.5	45.0	42.0	39.5
0400	50.0	47.5	45.5	51.5	43.5	41.0	50.5	44.0	41.0
0500	52.0	49.0	46.0	55.0	49.5	44.0	59.5	48.0	44.5

Note: Shaded areas represent nighttime hours.

Graphs of the continuous data using these statistical measures presents a much more accurate description of the noise environment against which noise from the proposed project should be judged. The most important time period is late at night during normal sleep hours when ambient noise levels are low because human activity is at a minimum and wind speeds have generally diminished.

The data graphs are presented in Figures 5.9-2 through 5.9-4 for the three locations. The top graph in each figure is a plot of the 1-minute L_{eq} levels. The effects of individual events, such as heavy truck passages, can be seen as tall spikes in these graphs. The lower graph is of the hourly equivalent noise levels and the statistical levels exceeded 50 and 90 percent of each hour (L_{eq}, L_{50} and L_{90}). The L_{90} level would be most affected by a new facility such as a power plant that generally produces a constant level of noise.

The L_{90} pattern at Location 1 (Figure 5.9-2, lower curve of the lower graph) is not typical of most locations that have lower levels at night and higher levels during the day due to human activities. This pattern is reversed at all three locations. The daytime L90 level was about 34 dBA, whereas the nighttime L90 level was higher at about 45 dBA. The generally lack of manmade noise and the weather are believed to be responsible. Traffic noise on I-580 maintains the background noise level at Location 1 throughout the day and night. However, during the day weather conditions were conducive to dissipation of the sound upward, but at night the sound waves would spread more horizontally. This is all related to temperature layers in the atmosphere and the relative bending of sound waves under different conditions. Insect activity can also create this reversal of the typical pattern. However, the level of such activity was minor. The tall spikes seen in the upper portion of the figure are from individual passages of cars and trucks on Midway Road near the microphone. Traffic noise from I-580 is at a more constant low level that defines the L90 curve in the lower graph. There are a few isolated residences within about 1000 feet of this location.

At Location 2 in front of the isolated residence on Midway Road east of the Tesla Substation, the day/night pattern is similar with higher levels at night. Daytime L90 levels were typically about 36 dBA, whereas the nighttime L90 levels were higher at about 41 to 45 dBA. The Tesla Substation, instead of I-580, is the only source of background noise at this location one mile southeast of the site. The tall spikes seen in the upper graph are passages of cars on Midway Road very near the microphone. The shorter spikes are likely from traffic on Patterson Pass Road about 200 yards to the north. In general, the substation was inaudible during the day and only a low-level hum was heard at night. Cricket activity was noted in the early evening and could be responsible for some of the higher levels at night.

Location 3 was at the gate to the Mulqueeney Ranch on the opposite side of the substation. Noise levels here were more impacted by traffic on Patterson Pass Road that was only about 50 feet from the microphone. The intermittent traffic, however, did not impact the L90 measurement that was maintained by the substation and/or insect activity. Daytime L90 levels were about 36 dBA and nighttime levels about 39 dBA. Actual noise levels at the ranch about 0.25 miles south of the gate would be expected to be about 2 dBA lower at night, i.e., 37 dBA at night.

In summary, the existing noise environment is fairly quiet in the area. Noise from traffic on the local roads was significant at some of the microphone locations, but it would be less at the residences. Traffic on I-580 maintains the background at Location 1 and the existing Tesla Substation maintains the background at Locations 2 and 3 nearer the site.

5.9.2 Environmental Impacts

Noise will be produced at the site during construction and during operation of the combined cycle power generation facility. Potential noise impacts and compliance with standards have been assessed by determining expected noise levels from these activities that would result at the residential receptors around the site. These levels were then compared with applicable criteria to determine the potential for significant noise impacts.

5.9.2.1 Construction Impacts

Noise will be produced during the approximate two year construction period at varying levels depending upon the construction phase. Construction of power plants and other industrial facilities can generally be divided into five phases, which utilize different types of construction equipment and produce different amounts of noise. The phases are: 1) excavation; 2) concrete pouring; 3) steel erection; 4) mechanical; and 5) cleanup. An activity known as "steam blow" is conducted during the cleanup phase just prior to full plant start up. This activity has the potential to create the most noticeable noise occurring during the entire construction period. The noise is of such a different character and duration that it must be analyzed separately from the other noise sources. At some construction sites, ground clearing is included as a separate phase, but it will be so minimal at the TPP project site that it is not included.

Both the Environmental Protection Agency Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities (EPA, 1971 and Barnes et al., 1976). Since specific information on types, quantities and operating schedules of construction equipment is not available for the project at this point in the project development, information from these documents for similar sized industrial projects will be used. Use of this data, which is between 25 and 30 years old, is conservative since the evolution of construction equipment is toward quieter designs as the country becomes more urbanized and the population becomes more aware of the adverse effects of noise.

The noisiest equipment types generally operating at a site during each phase of construction are presented in Table 5.9-3. The composite average or equivalent site noise level, representing noise from all equipment, is also presented in the table for each phase. The highest level of any individual piece of equipment is 98 dBA for a rock drill. However, the use of rock drills may not be necessary at the TPP site. Heavy trucks operating at maximum engine speed are the second loudest equipment items at 91 dBA.

Table 5.9-3. Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level at 50 feet (dBA)	Composite Site Noise Level at 50 feet (dBA)
Site Clearing and Excavation	Dump Truck Backhoe	91 85	89
Concrete Pouring	Truck Concrete Mixer	91 85	78
Steel Erection	Derrick Crane Jack Hammer	88 88	87
Mechanical	Derrick Crane Pneumatic Tools	88 86	87
Clean-Up	Rock Drill Truck	98 91	89
Steam Blow	Steam Blow (unmuffled)	110 @ 1,000 feet	Not Applicable

Source*:* USEPA 1971, Barnes, et al., 1976.

The steam blow, with a level of 110 dBA at 1000 feet, is an activity rather than a piece of equipment. This activity is designed to clean scale and other debris from the boiler tubes and steam lines prior to admitting any steam to the steam turbines where the foreign material would damage the blades. A temporary bypass line to the atmosphere is welded into the main steam line upstream of the steam turbines to divert the steam. Several short blows of about two minutes duration each will be performed per day and the entire process may take two to three weeks.

Average or equivalent construction noise levels projected to the nearest residences from the acoustic center of construction activities are presented in Table 5.9-4. The only attenuating mechanism considered for the construction noise is divergence or geometrical spreading of the sound waves at a rate of 6 dBA per doubling of the reference distance. This presents a very conservative analysis at the great distances to the nearest residences. Figure 5.9-5 shows the locations of these residences that were also used as the receptors in the computer modeling of operational noise impacts described in the next section.

Table 5.9-4. Average Construction Noise Levels at Receptor Locations

Construction Phase	Direction and Distance from Acoustic Center	
	Receptor 1 Southeast Residence on Midway Road (1 mile)	Receptor 2 South Residence - Mulqueeney Ranch House (1.2 miles)
Excavation	49	47
Concrete Pouring	38	36
Steel Erection	47	45
Mechanical	47	45
Clean-up	49	47
Steam blow* (unmuffled)	96	94

Note: Steam blow levels are instantaneous rather than averaged.

These results are conservative since the only attenuating mechanism considered was divergence of the sound waves over distances traveled. Levels during the loudest normal construction activities are projected to be between 47 dBA and 49 dBA at the residences located at distances ranging from 1 mile to 1.2 miles. These levels are higher than the existing daytime L_{90} levels but lower than the L_{eq} levels. Thus, average construction noise generally will be audible at the residences except when nearby intrusive sounds is present. These results suggest that any noise impacts during construction will be minor at the TPP site.

The high levels of 94 dBA to 96 dBA presented in Table 5.9-4 for the steam blow activity at residential receptors are instantaneous levels that would be heard during the short blows of about two minutes each. The projected levels are sufficiently high to startle residents and disrupt conversation and other activities for a brief time. This temporary noise impact will occur only during normal work hours and be limited to two to three weeks near the end of the construction period. Furthermore, atmospheric absorption alone should reduce this mid to high frequency noise by an additional 10 or 20 dBA at the residences. It is not anticipated that this will create a significant noise impact at these distances.

A public awareness campaign will be conducted prior to this operation to alert the few area residences of the expected noise levels, duration, schedule and purpose, and to the fact that it is a temporary one-time operation that is not a part of plant operations.

5.9.2.2 Operational Impacts

The project will consist of four GE Frame 7FA combustion turbine-generators (CTGs), two steam turbine-generators (STGs), four heat recovery steam generators (HRSGs), a cooling tower, and associated auxiliary equipment. Each CTG will be equipped with an inlet silencer and will be enclosed in an outdoor acoustical enclosure. The HRSGs will act as effective silencers for the CTG exhausts. In general, equipment will be specified to have near-field noise levels that do not exceed 85 dBA at three feet to limit the noise exposure of plant personnel to acceptable levels. As a result of these design features and the large distances to the receptors, no significant noise impact is expected at any location.

A proprietary computerized noise prediction program was used to simulate and model the noise propagation from the proposed project. The computer outputs are in terms of octave band and overall A-weighted sound pressure levels (abbreviated SPL or L_p) at discrete receptor positions or at grid map nodes (in preparation for computing a contour map). The output listing is ranked by relative noise contribution from each noise source. This model has been validated over the years via noise measurements at several operating plants that had been previously modeled during the engineering design phases.

This model uses industry-accepted propagation algorithms based on standards written by CONCAWE[1]. The calculations account for classical sound wave divergence (spherical spreading loss with adjustments for source directivity from point sources) plus attenuation factors due to air absorption, minimal ground effects, and barrier/shielding[2].

The modeling study used plant layout configurations and equipment information for the proposed facility from Duke/Fluor Daniel (D/FD)[3]. Specifically, the study focused on the potential noise generated by the proposed four trains of Gas-Fired Combustion Turbines (General Electric Frame 7FA's), four heat recovery steam generators (HRSGs), two steam turbine generators (STGs) with steam condensers, large water pumps, and six main power transformers. The pertinent U. S. Geological Survey (USGS) topographical maps[4] and the D/FD plot plan drawing[5] were used to establish the overall noise analysis area and the position of the noise sources and receptors, respectively. Modeling receptors used the same receptor locations as where ambient monitoring was performed. The source and receptor locations were translated into input coordinates for the noise modeling program.

For conservatism and as is standard practice in the description of environmental noise, the modeling assumed stable atmospheric conditions suitable for reproducible measurements (under "standard-day" conditions of 59° F and 70% RH), that are favorable for propagation. These inherent conservative factors and assumptions result in a noise model that will tend to be biased to higher predicted values than would be expected in the actual environment around the Tesla site.

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[1] CONCAWE is the oil companies' European organization for environment, health, and safety; headquartered in Brussels, Belgium. The noise propagation standard was originally published in 1981 under the title "The propagation of noise from petroleum and petrochemical complexes to neighboring communities". Parts of this method are also included in the ISO 9613, ISO 1913 (Part 1), ANSI 126, or ISO 3891 standards.

[2] For ease-of-use and computational efficiency, the PC model does not provide for special screening effects, or complex meteorological variables.

[3] D/FD is an Engineering and Construction company that is performing front-end engineering in support of Florida Power and Light's (FPL's) Tesla Power Project Application to the Commission.

[4] U.S. Geological Survey Quadrangle Map, Midway, Calif., NE/4 Altamont 15' Quadrangle, 34121-F5-TF-024, Photorevised 1980, DMA 1659 II NE-Series V895.

[5] "Tesla Power Project", Preliminary Site Plan, prepared by Duke/Fluor Daniel, June 8, 2001.

All continuous-operation equipment items that were deemed to be significant noise sources at the proposed TPP were included in the baseline noise model. The plant was assumed to operate 24 hours per day, which means its noise output would be constant, regardless of time-of-day. The set of modeled sources included:

- turbines (gas and steam in the power block),
- heat recovery steam generator (HRSG),
- 22-cell cooling tower array,
- main transformers,
- several pump and motor trains, and
- an instrument air compressor.

Items that were considered as insignificant sources, such as pumps less than 20 horsepower, were excluded from the analysis. Major buildings and large tanks were included as barriers, as were the large, solid equipment trains (e.g. the HRSG trains). For conservatism, the cooling tower was not used as a barrier.

Calculations in the predictive model are performed using octave band sound power levels (abbreviated PWL or L_w) as inputs from each noise source. Rather than use estimated source inputs levels that can be calculated from accepted industry references[6], the modeling inputs used noise emission values that were obtained from equipment vendors on several recent D/FD design efforts that use very similar Frame 7FA-based plant configurations. This use of vendor-supplied noise level information for the specific equipment that is planned for the TPP means that the modeling has a higher level of accuracy, as compared to modeling done with generic type and size information for the power plant equipment. The noise emissions levels used for this analysis are summarized in Table 5.9-5.

Table 5.9-5. Summary of Modeling Noise Emissions Levels

Equipment Item	Equivalent Sound Pressure Level, SPL in dBA
GTG trains (each)	66 dBA at 400' (far-field); 85 dBA at 3' (near-field)
STG trains (each)	60 dBA at 400' (far-field); 85 dBA at 3' (near-field)
HRSG train (each)	59 dBA at 400' (far-field); 85 dBA at 3' (near-field)
HSRG stack exhaust (only)	53 dBA at 400' (far-field)
Cooling Tower (entire array)	62 dBA at 400' (far-field); 85 dBA at 3' (near-field)
Main Transformers	55 dBA at 400' (far-field); 85 dBA at 3' (near-field)
Boiler Feedwater Pump Trains Main Cooling Water Pump Trains	93 dBA at 3' (near-field)
Vacuum Condensate Pump Trains Auxiliary Cooling Water Pump Trains Closed Loop Cooling Water Pump Trains	90 dBA at 3' (near-field)
Instrument Air Compressor	80 dBA at 3' (near-field)

[6] Such as the Edison Electric Institute Technical Report, "Electric Power Plant Environmental Noise Guide"

The modeling study was based on the conservative scenario that the new facility could operate at maximum loads for an entire 24-hour period. This scenario is conservative because electricity demand normally ramps downward at night when commercial activities decline and when residential usage decreases (as people turn off lights, televisions, and appliances before going to sleep). The modeling was, nevertheless, performed assuming 24 hours of maximum loads to assure that even under these unusual conditions, the TPP will comply with Commission noise control requirements and the Alameda Noise Element requirements at all hours of the day and night.

Table 5.9-6 presents a summary of the modeled noise levels compared against measured ambient noise levels and applicable ordinance levels. The predicted levels of 41 dBA and 39 dBA at the two receptors are below the Alameda County ordinance level of 45 dBA. In addition, the predicted levels are less than a 5 dBA increase over background, and thus within the range generally presumed to be insignificant. Thus, noise levels produced by the project are expected to be acceptable at the residences and no extraordinary noise control measures will be required. There are no residents, hospitals, libraries, schools, places of worship or other facilities where quiet is an important attribute within the area potentially impacted by an increase in 5 dBA above background.

Table 5.9-6. Predicted Plant Noise Levels at Receptor Locations

Receptor Location	Avg. 4 Lowest Nighttime L_{90} (dBA)	CEC Criteria of L_{90} + 5 dBA (dBA)	Applicable Ordinance Level (dBA)	Predicted Plant Noise Level (dBA)	Assessment
Nearest Residence to the SE on Midway Road	41.5	46.5	45	41	OK
Nearest Residence to the South - Mulqueeney Ranch	37*	42	45	39	OK

* Estimated based on level measured at the gate to the ranch.

Water Pumping Station

Plant noise levels are not a consideration at the proposed water pumping station at the aqueduct because of the great distance to the location of 1.75 miles and the intervening hills. However, the pumps at the station would produce noise that could be heard at residences that are approximately 1000 feet from the location. These pumps will either be selected as low noise pumps or enclosed in a small building such that the resulting noise level at the residences will not exceed 45 dBA. The proposed 45 dBA level at the houses will be in compliance with the county ordinance. Thus, no noise impact will occur from the water pumping station.

5.9.2.3 Onsite Noise Levels

Onsite management of noise is governed by Federal OSHA/Cal-OSHA. Cal-OSHA requires hearing protection for workers exposed to noise levels greater than 85 dBA for extended periods. The modeling indicates that, at close range, noise levels of 85 dBA or greater may be experienced in localized areas with a high density of equipment noise sources. For these localized areas, worker hearing conservation will be addressed via hearing protection devices, limited access time, and health and safety training. Consequently, on-site impacts to employees from the Project will not be significant with hearing protection and training procedures implemented as part of a project health and safety program.

5.9.2.4 Audible Switchyard/Transmission Line Noise Levels

During operation, the transmission line will emit a corona or hum (see discussion in Section 4.2.2) which is somewhat audible immediately beneath the line and slightly audible for up to approximately 100 feet on either side of the line. This level of noise will not have a significant impact on the surrounding environment because the nearest receptors are located much more than 100 feet away from the line. The switchyard will also be located away from inhabited areas and is not expected to generate noise that will be significantly additive to the noise levels the Project.

5.9.3 Noise Complaint Resolution Procedure

A complaint resolution procedure presented in the following paragraphs will provide an efficient and effective means of receiving and resolving any noise complaints. An outline sample form for the procedure is provided in Figure 5.9-6.

Any noise complaints received by the facility switchboard operator will be entered in a "Noise Complaint Logbook" kept at the switchboard desk. The date, time, name, address and phone number of complainant, nature of the complaint and name of the switchboard operator (or other person receiving the call) will be recorded. The logbook entries will always be chronological in order and simply provide evidence that a complaint was received. The caller will then be transferred to the plant manager or shift supervisor who will obtain a thorough understanding of the complaint so that appropriate action can be taken. The manager will briefly explain the resolution procedure to the caller and provide assurance that the problem will be investigated in a timely manner and corrected to the fullest extent practicable.

The manager will then record the information from the logbook on a blank "Noise Complaint Resolution" form presented below. This form provides additional space for a description of the problem and measures taken to resolve the problem. These loose-leaf preprinted forms will be kept in a three-ring binder maintained by the plant manager or a designee.

The plant manager or designee will investigate the reported noise problem. The offending equipment or activity will be identified and noise levels documented by taking near- and far-field measurements prior to applying any treatment. Near-field noise levels are to be taken at a distance of 3 feet from the equipment and far-field measurements are to be taken at the

Figure 5.9-6. Noise Complaint Resolution Form

NOISE COMPLAINT RESOLUTION FORM TESLA POWER PROJECT, MIDWAY POWER LLC ALAMEDA COUNTY, CALIFORNIA
Complainant's name and address:
Date complaint received: Time complaint received:
Nature of noise complaint:
Definition of problem after investigation by plant personnel:
Initial noise levels at 3 feet: __________ dBA Initial noise levels at the complainant's property: __________ dBA Final noise levels at 3 feet: __________ dBA Final noise levels at the complainant's property: __________ dBA
Description of corrective measures taken:
Approximate installed cost of corrective measures: Date installation completed: Date first letter sent to complainant: (copy attached) Date final letter sent to complainant: (copy attached)
This information is certified to be correct: Plant Manager's Signature

(Attach additional pages and supporting documentation, as required.)

complainant's property. Appropriate treatment will be determined to reduce or eliminate the noise and, after application of the treatment, additional noise measurements will be taken at the same locations to document the improved condition.

To the extent practicable, full resolution of small problems that can be corrected through a minimal change in procedure or by application of noise control materials costing less than $2000, including installation, will occur within 30 days of the receipt of the complaint. For larger problems requiring measures that cannot be completed in 30 days, the plan and schedule for completion will be established within 30 days after receipt of complaint. After the initial investigation and determination of the schedule for correction, a letter will be sent to the complainant detailing the findings and expected date of completion of any modification. After the correction has been fully implemented and reduced noise levels documented, a second letter will be sent to the complainant explaining that the problem has been corrected.

In a situation where the complaint does not appear to be justified, as based on measured levels or other criteria, or where the plant manager believes the problem to be corrected but the complainant is not satisfied, additional recourse measures will be provided to the complainant. These will include the name and phone number of the Alameda County noise code enforcement official responsible for ensuring compliance with conditions of certification of the project. The Noise Complaint Logbook, the loose-leaf book of noise forms, copies of letters sent to complainants and any other material documenting changes in procedure or installation of noise control materials will be made available to the county officials, as requested.

5.9.4 Significant Unavoidable Adverse Impacts

No noise impacts are expected to result at any noise-sensitive receptor around the plant because of the large buffer area between the site and the receptors. The highest level predicted at any residence is 41dBA southeast of the plant (Table 5.9-5). At the nearest residence in other directions, the predicted level is 39 dBA. Thus, no significant unavoidable adverse impact on noise resources is anticipated as a result the operation of the TPP.

5.9.5 Cumulative Impacts

Increases in noise levels above existing ambient levels during construction and operation will generally not be noticeable beyond one mile from the site. Thus, direct cumulative impacts with other projects will only occur if the other new projects are located within a one-mile radius of the site. No similar projects are known to be planned in the area, and so no direct cumulative noise impacts will occur.

Small increases in highway traffic noise will occur throughout a large area extending beyond the one-mile radius described above during construction and operation of the project. Increased traffic noise will exist from the origination point of each individual trip to the TPP as well as on the return trip. Some overlap with traffic due to other new and planned projects will undoubtedly occur at distant locations. However, due to the logarithmic nature of decibel addition, significant changes in the volume of traffic are required to effect even minor changes in noise levels. For example, a doubling of the volume of traffic is required to increase the traffic noise level by the barely noticeable amount of 3 decibels. The cumulative increase in traffic volumes will not be doubled at any location, near or far. Thus, there will be no noticeable indirect cumulative noise impact due to highway traffic.

No significant cumulative noise impacts are anticipated. Thus, no mitigation measures are proposed.

5.9.6 LORS Compliance

Design, construction and operation of the TPP, including transmission lines, pipelines, and ancillary facilities, will be conducted in accordance with all LORS pertinent to noise from the project.

5.9.6.1 Compliance with County Noise Ordinance

Based on the noise analysis presented in section 5.9.2.2, noise impacts are expected to comply with the provisions of the County Noise Ordinance at all hours of the day and night.

5.9.6.2 Compliance with Cal-OSHA Noise Exposure Requirements

Worker exposure levels during construction of the TPP will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Hearing protection will be available for workers and visitors to use as needed throughout the duration of the construction period. A hearing protection program, which complies with Cal-OSHA requirements, will be incorporated into the Health and Safety Plan.

During operations, in addition to far-field noise limits, nearly all components will also be specified with near-field maximum noise levels of 85 dBA at 3 feet. Since there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA, such as inside acoustical enclosures. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source.

5.9.7 Involved Agencies and Agency Contacts

The agency responsible for enforcement of noise levels at the TPP is the Alameda County Planning and Community Development Department. The person to contact regarding noise emission levels from the TPP is shown in Table 5.9-7.

Table 5.9-7. Involved Agencies and Agency Contacts

Agency/Address	Contact/Telephone	Permits/Reason for Involvement
Alameda County Community Development Agency, Planning Department 224 W. Winton Avenue, Room 151 Hayward, CA 94580	Bruce Jensen, Sr. Planner (510) 670-6527	Information regarding County Noise Ordinance.

5.9.8 Permits Required and Permit Schedule

No permits are required.

5.9.9 References

Barnes, J.D., L.N. Miller, and E.W. Wood. 1976. Prediction of Noise from Power Plant Construction. Bolt Beranek and Newman, Inc., Cambridge, Massachusetts. Prepared for Empire State Electric Energy Research Corporation, Schenectady, New York.

Miller, L.N., E.W. Wood, R.M. Hoover, A.R. Thompson, and S.L. Paterson. 1978. Electric Power Plant Environmental Noise Guide, Volume 1. Bolt Beranek and Newman, Inc., Cambridge, Massachusetts. Prepared for Edison Electric Institute, New York, New York.

USEPA (U.S. Environmental Protection Agency). 1974. Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. 550/9-74-004, Office of Noise Abatement and Control, Washington, DC.

USEPA. 1971. Noise from Construction Equipment and Operations, US Building Equipment, and Home Appliances. Prepared by Bolt Beranek and Newman for USEPA Office of Noise Abatement and Control, Washington, DC.